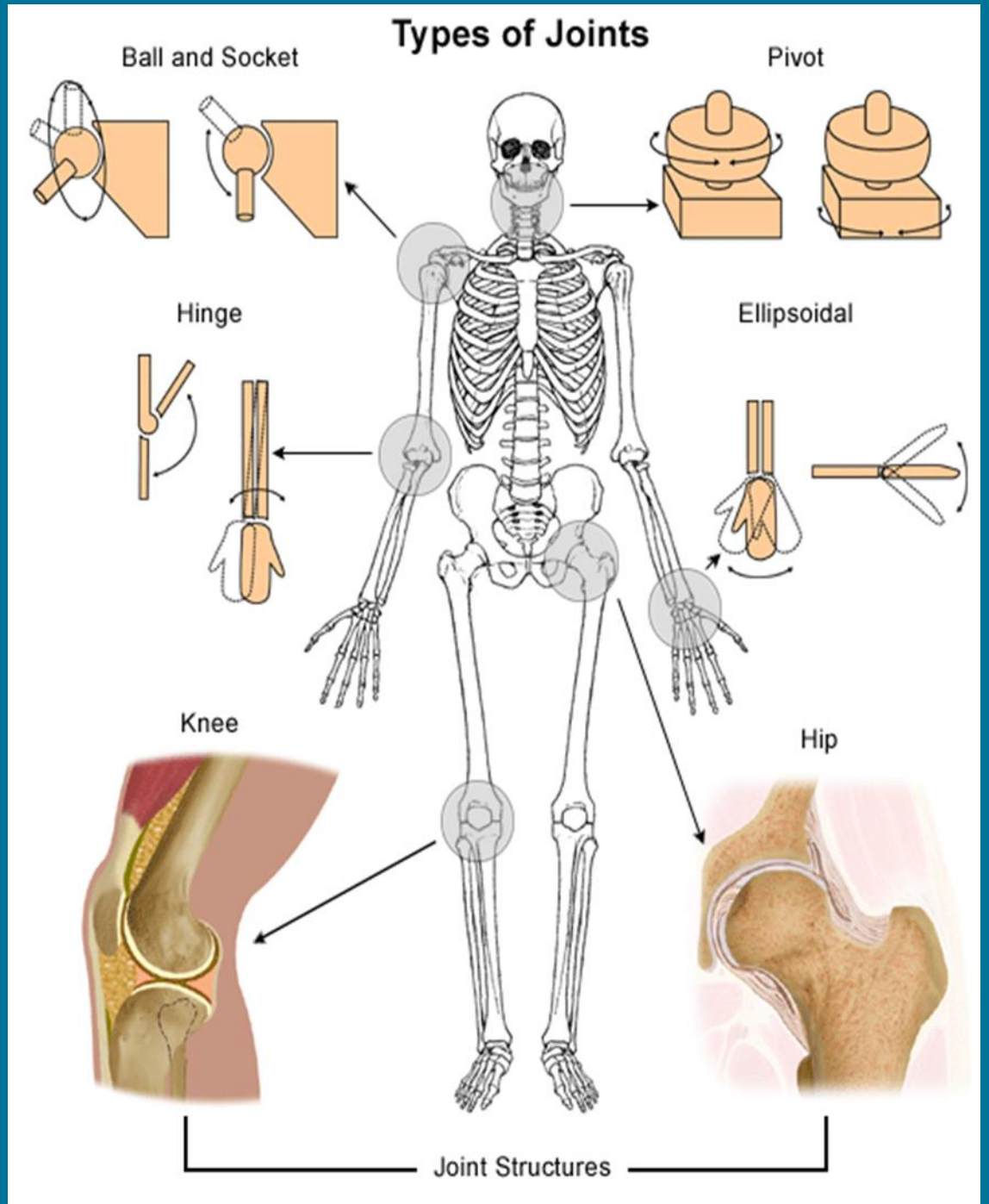
joints

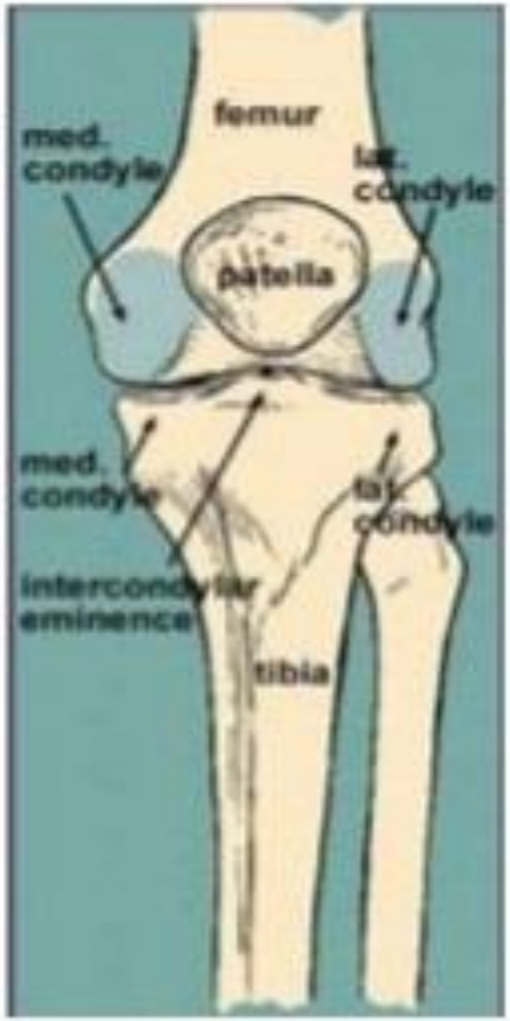
By■

DR. DALIA M. ■

BIRAM



Introduction of Joints



- Joint is a junction between two or more bones or cartilages.
- With the exception of the hyoid bone, every bone in the body is connected to or forms a joint.

Classification of joints

- Joint are classified into structural and functional.
- Structural classification is determined by how the bones connect to each other, while functional classification is determined by the degree of movement between the articulating bones.

CLASSIFICATION

1. Functional classification

- **Immovable (synarthrosis)**

  Cranial sutures in adult
  Pri cartilaginous jt. in children

- **Slightly movable (amphiarthrosis)**

  Secondary cartilaginous jts

- **Freely movable (diarthrosis)**

  Synovial jt.

STRUCTURAL classification of joints

A- FIBROUS JOINTS

B- CARTILAGINOUS JOINTS

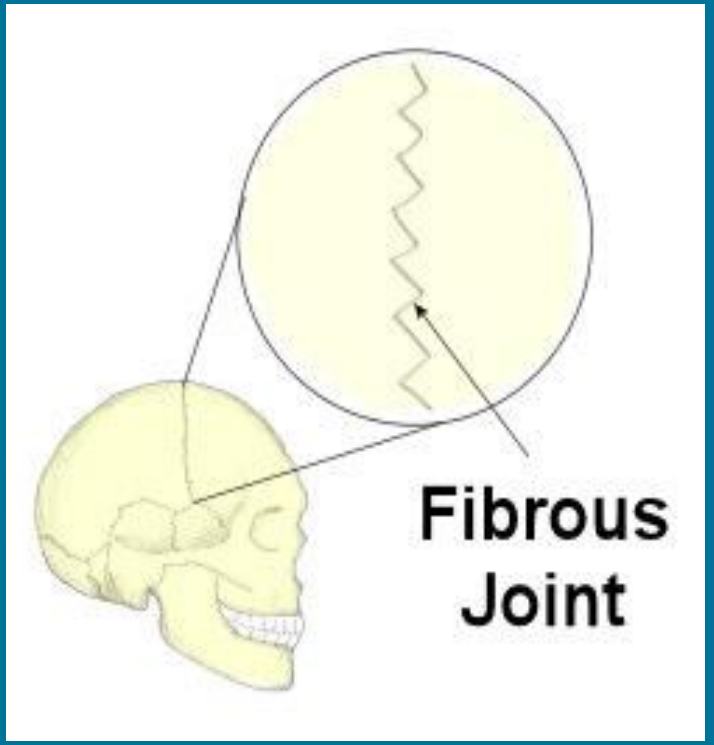
C- SYNOVIAL JOINTS

A- Fibrous joints:

Fibrous joints connect bones without allowing any movement This type of joint is held together by fibrous tissue

Types of Fibrous joints

1-Sutures
2-gomphosis
3-syndesmosis

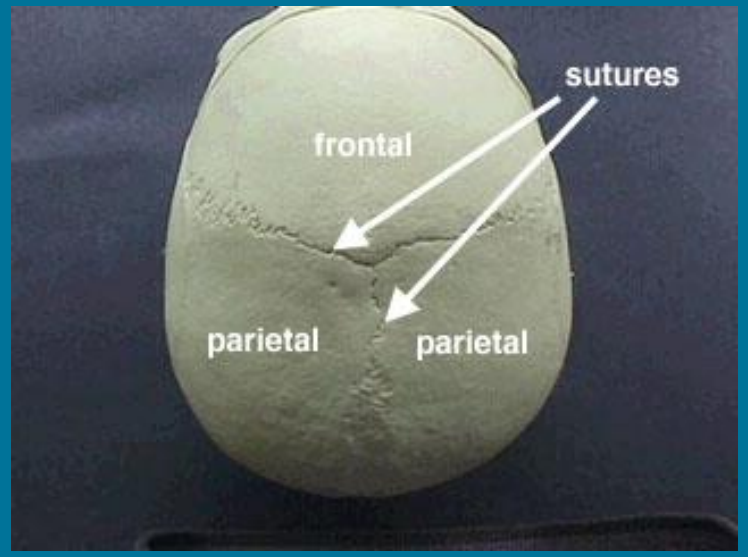


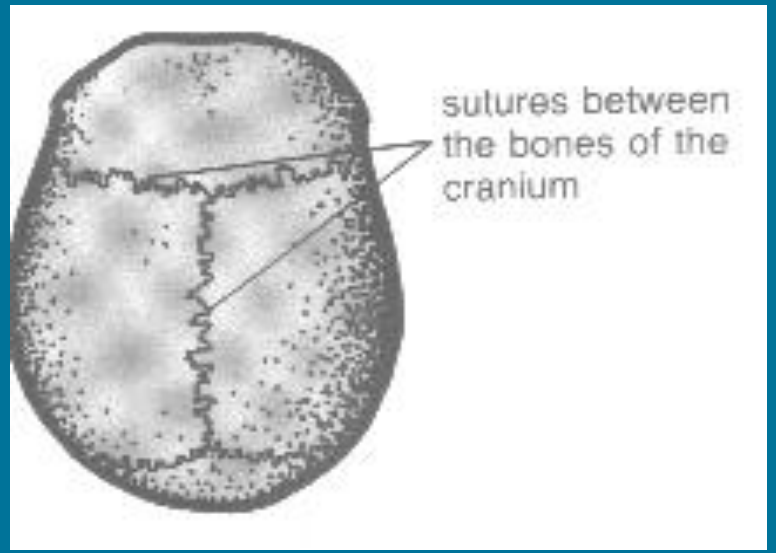
1-Sutures:

*The bone have serrated edges as irregular lines.

*The bones are separated by minimal amount of fibrous tissue.

*Example: sutures of the skull or cranium
It helps in growth of the skull bones.





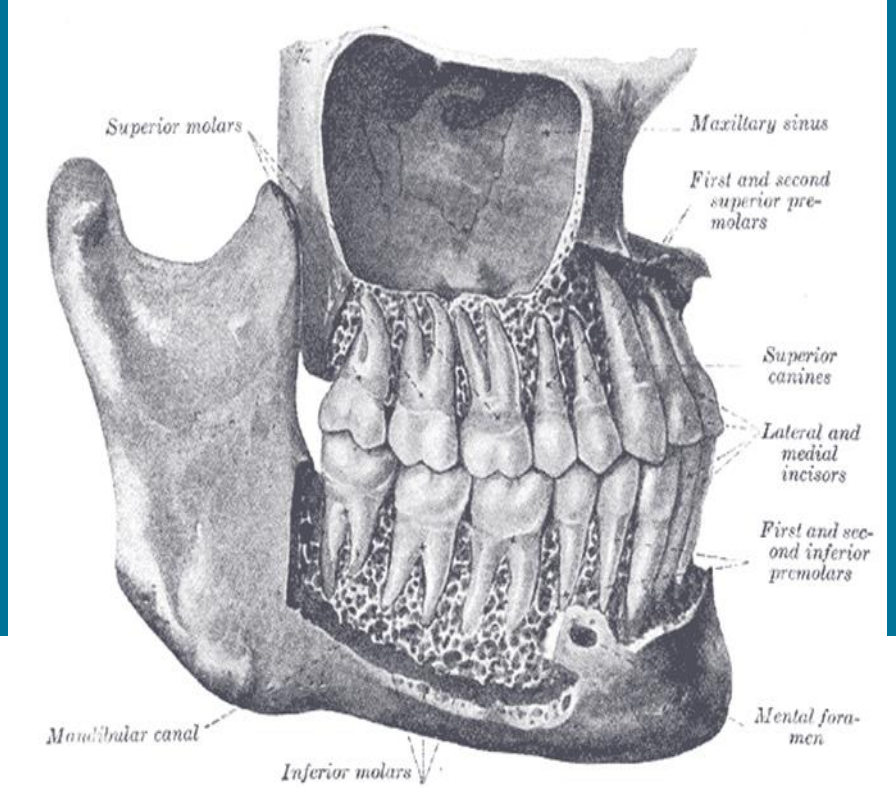
Gomphosis :-

*Gomphosis is a type of fibrous joint in which a tooth fits into a socket in a bone

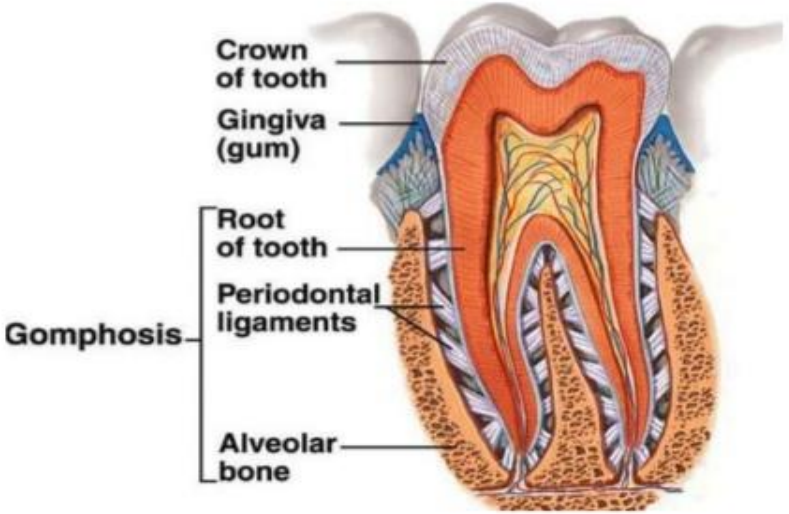
* The bones are peg & socket.

The bones are separated by moderate amont of fibrous tissue.

Example: root of teeth & the alveolar margine of maxilla.



- Peg & socket joints between tooth & its socket



3-syndesmosis:-

***The bones are rough**

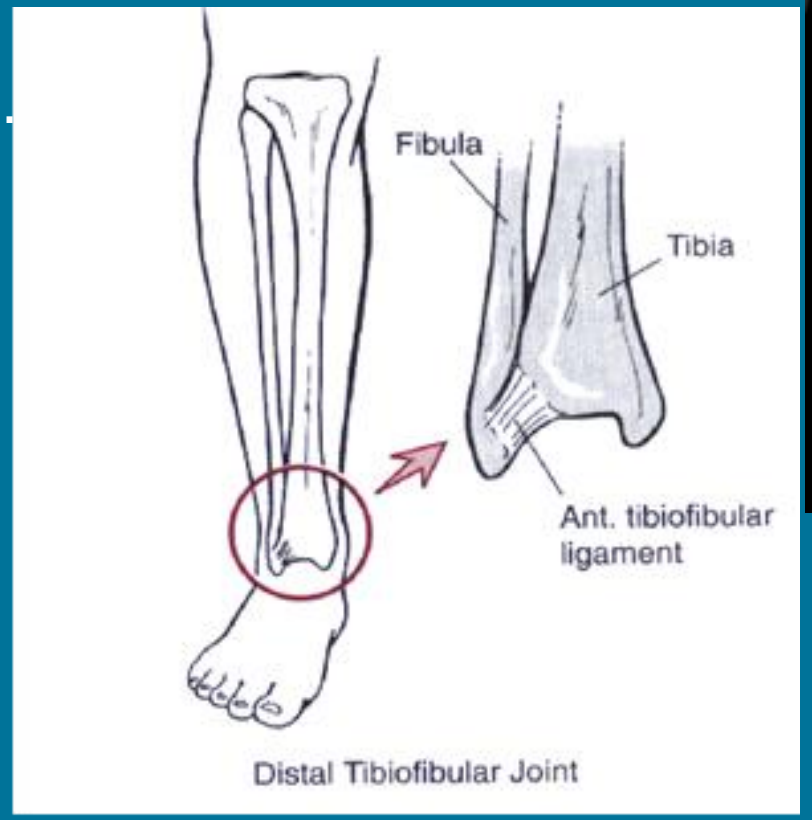
. The bones are separated by big amount of fibrous tissue

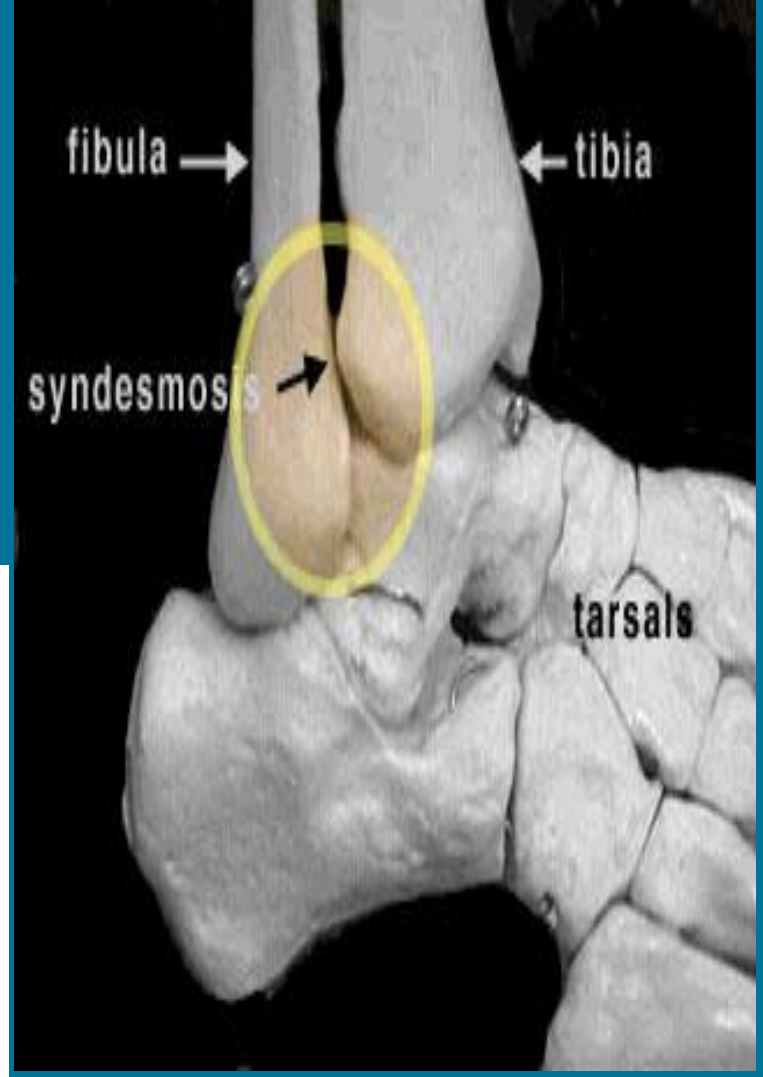
(interosseous ligament).

Example:

inferior tibio-fibular joint

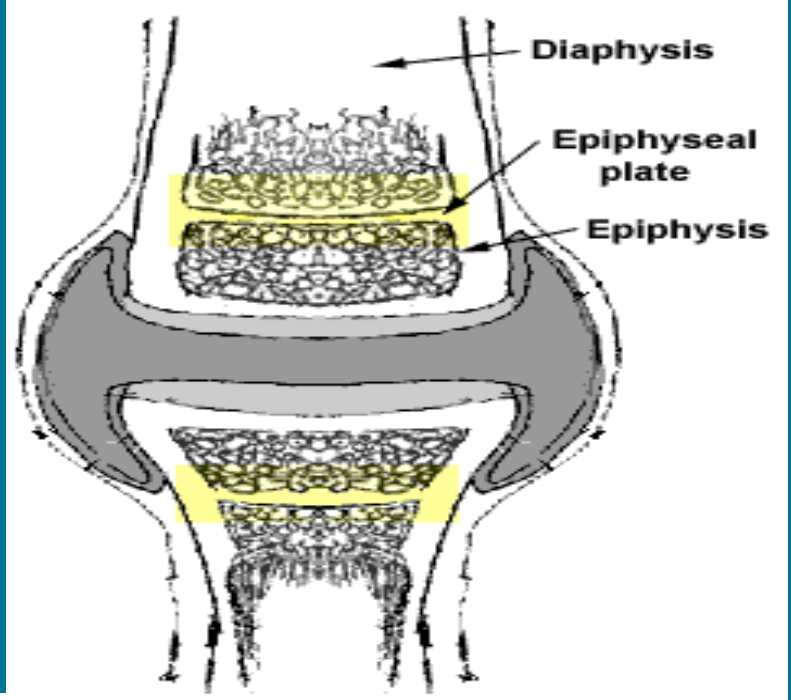
No movement is allowed

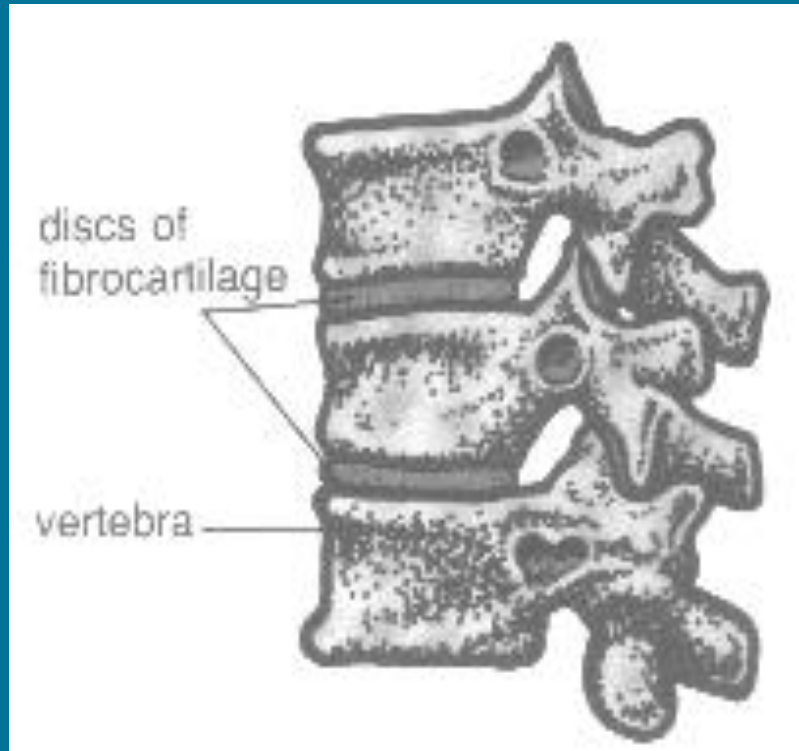




Cartilagenous joints

The bones are separated by cartilage.
It is devided to
1-Primary cartilaginous (SYNCHONDROSES)
2-Secondary cartilaginous (SYMPHYSES)





1- Primary cartilaginous (SYNCHONDROSES)

the cartilage between the bones is temporary

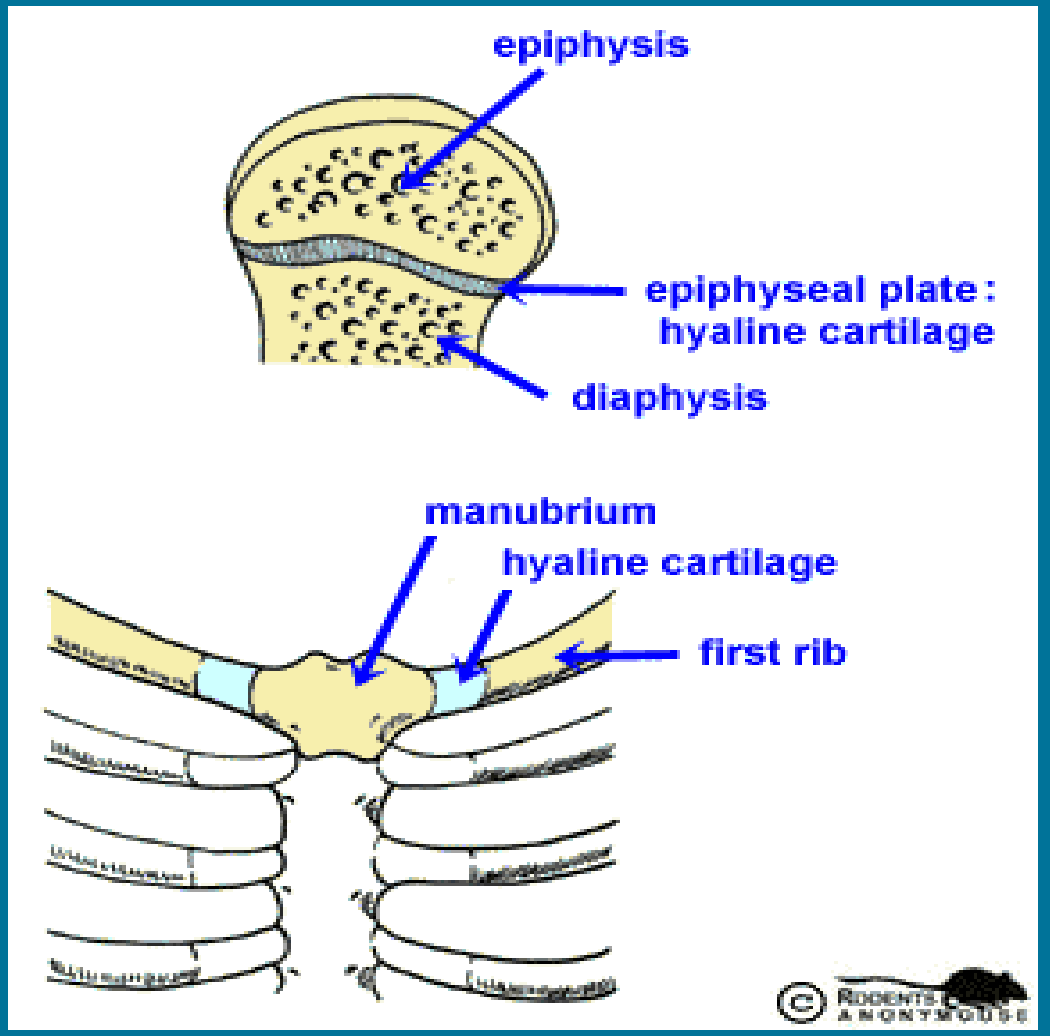
The bones are separated by hyaline cartilage

No Movement

Example:

1-the **growing ends of** long **bones**.

2- the first sterno- costal junction



2. Secondary Cartilaginous (Symphysis):

In this type the cartilage between the bones is permanent separated from each other by fibrocartilage

It has limited movements.

Example: **symphysis pubis** and most joints in the median plane as those present **between bodies of vertebrae**

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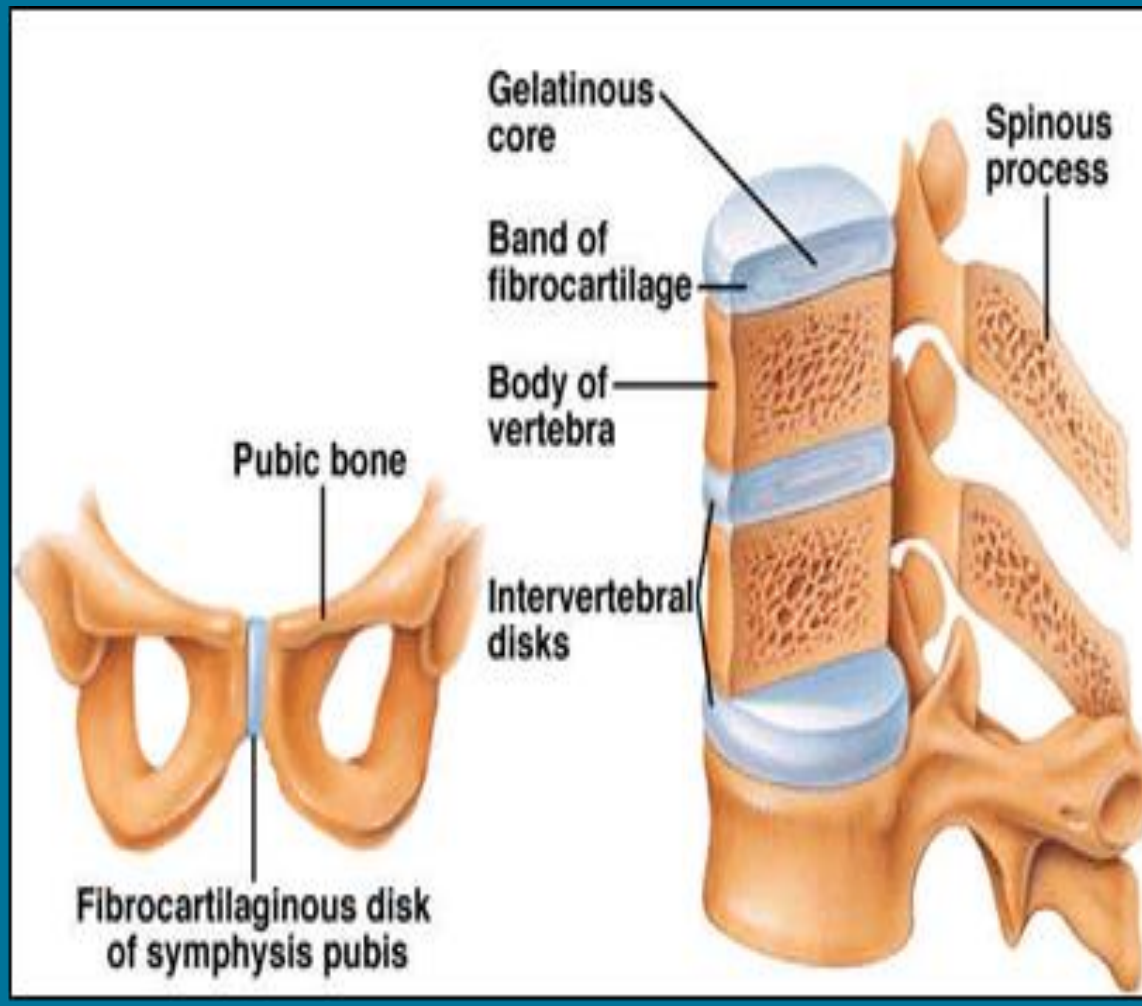


Comparison between the two types of the cartilagenous joints :-

	PRIMARY CARTILAGENOUS	SECONDARY CARTILAGENOUS
The cartilage between the bones	Temporary	permanent
The separation between the bones	Hyaline cartilage	Covered with hyaline cartilage and separated by fibrocartilage.
The movement	No movement	Limited movement
Examples	Growing ends of long bones	-Symphysis pubis -Between bodies of vertebrae

C- Synovial Joints:

The bones are separated by synovial fluid.

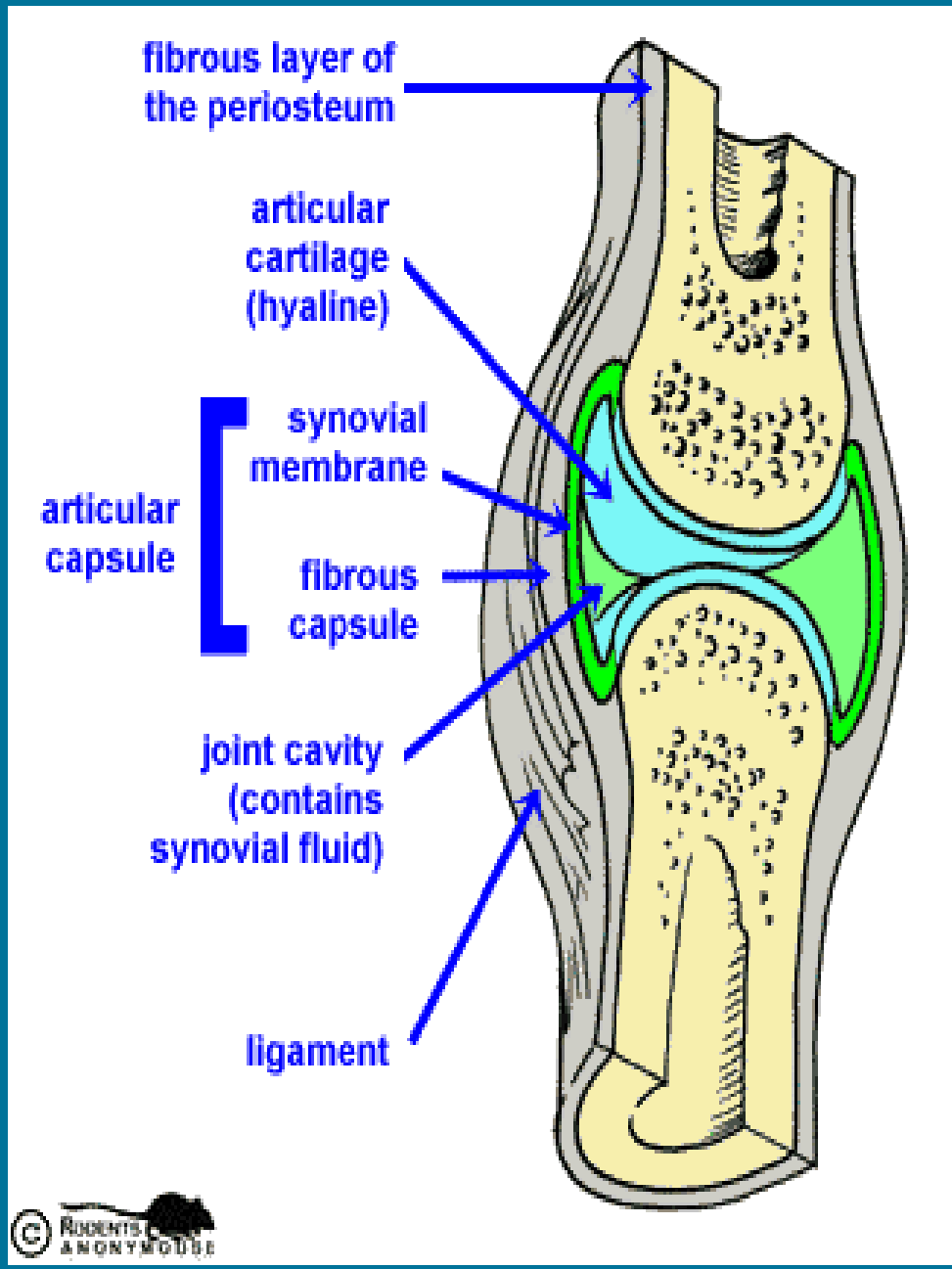
Most of the joints of the limbs are synovial.

General Features of Synovial Joints:

- The bones are covered with hyaline cartilage.
- The bones are separated by synovial fluid.
- There is a capsule that covers the joint.
- There is a synovial membrane that lines the capsule and covers all intracapsular structures except the articular surfaces.
- Inside the joint, there may be other structures as:

o Cartilagenous structures which may be in the form of a disc (sternoclavicular joint) or a meniscus (knee joint) or a labrum (shoulder joint).

o Tendon of a muscle: as the tendon of the long head

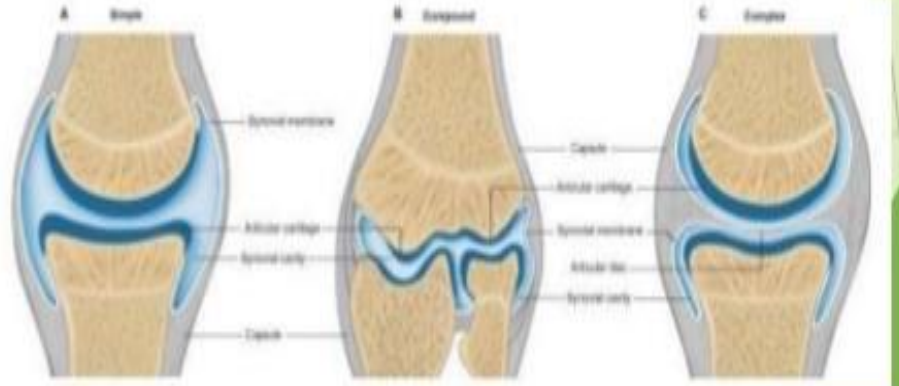


C-Synovial Joints:

Dr. Vibhash Kumar

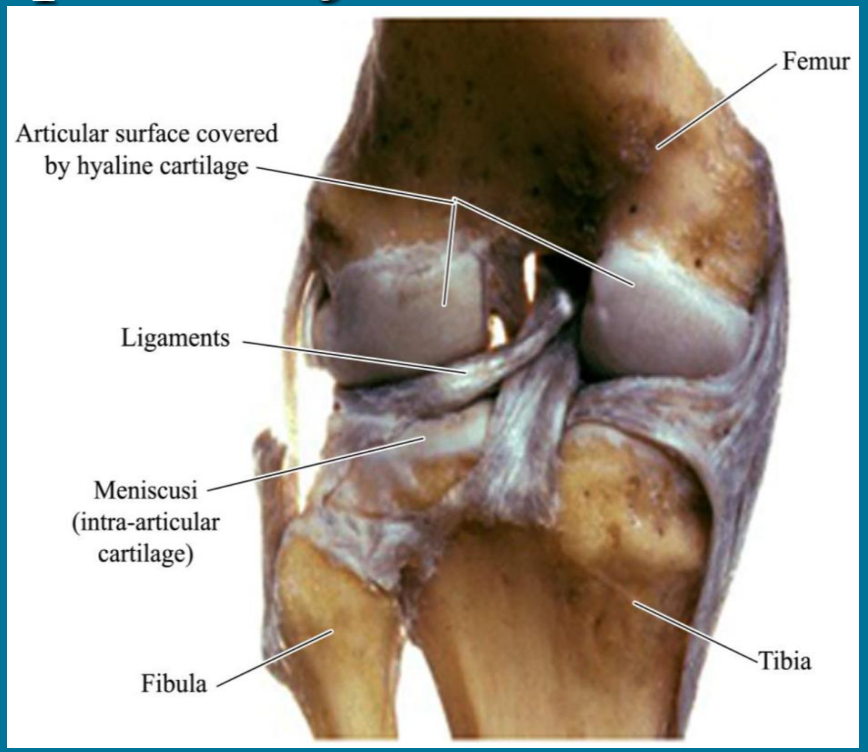
Classification According to number of articulating bones

- Simple Joint: 2 articulation surfaces (eg. shoulder joint, hip joint)
- Compound Joint: 3 or more articulation surfaces (eg. radiocarpal joint)
- Complex Joint: 3 or more articulation surfaces and an articular disc or meniscus (eg . knee joint)



-Combined joint :the two joints on both side of the body are acting together .

Example: TMJ



Classification according to number of axes and actions

Uniaxial

Biaxial

Polyaxial

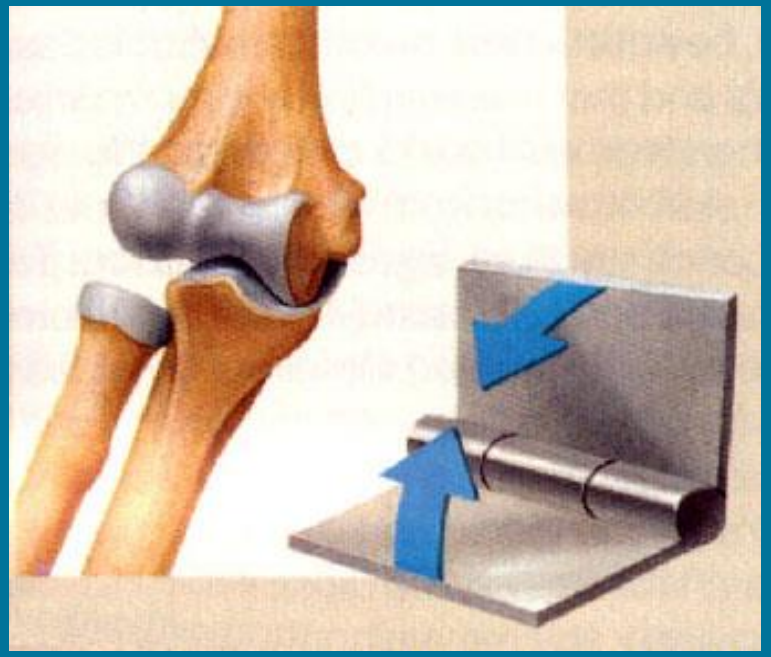
Plane (nonaxial)

A-Uniaxial joint

The joint moves around one axis

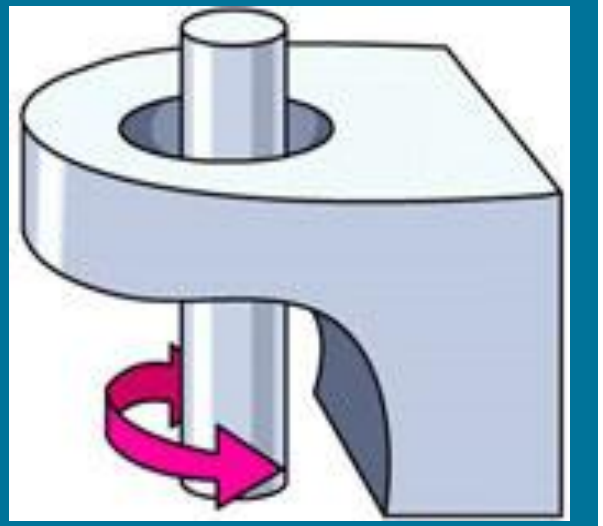
1-hinge joint

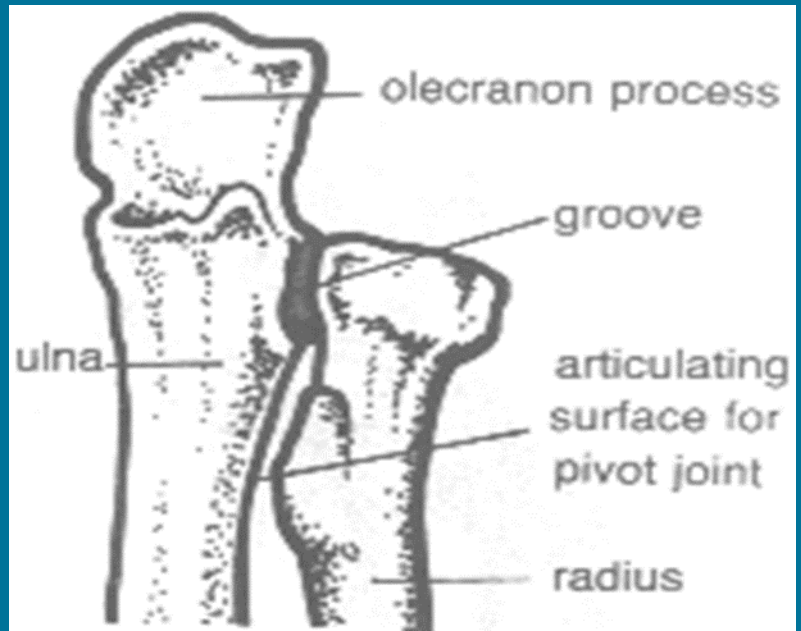
The joint moves around a horizontal axis.
Example: Elbow joint.
It allows flexion and extension



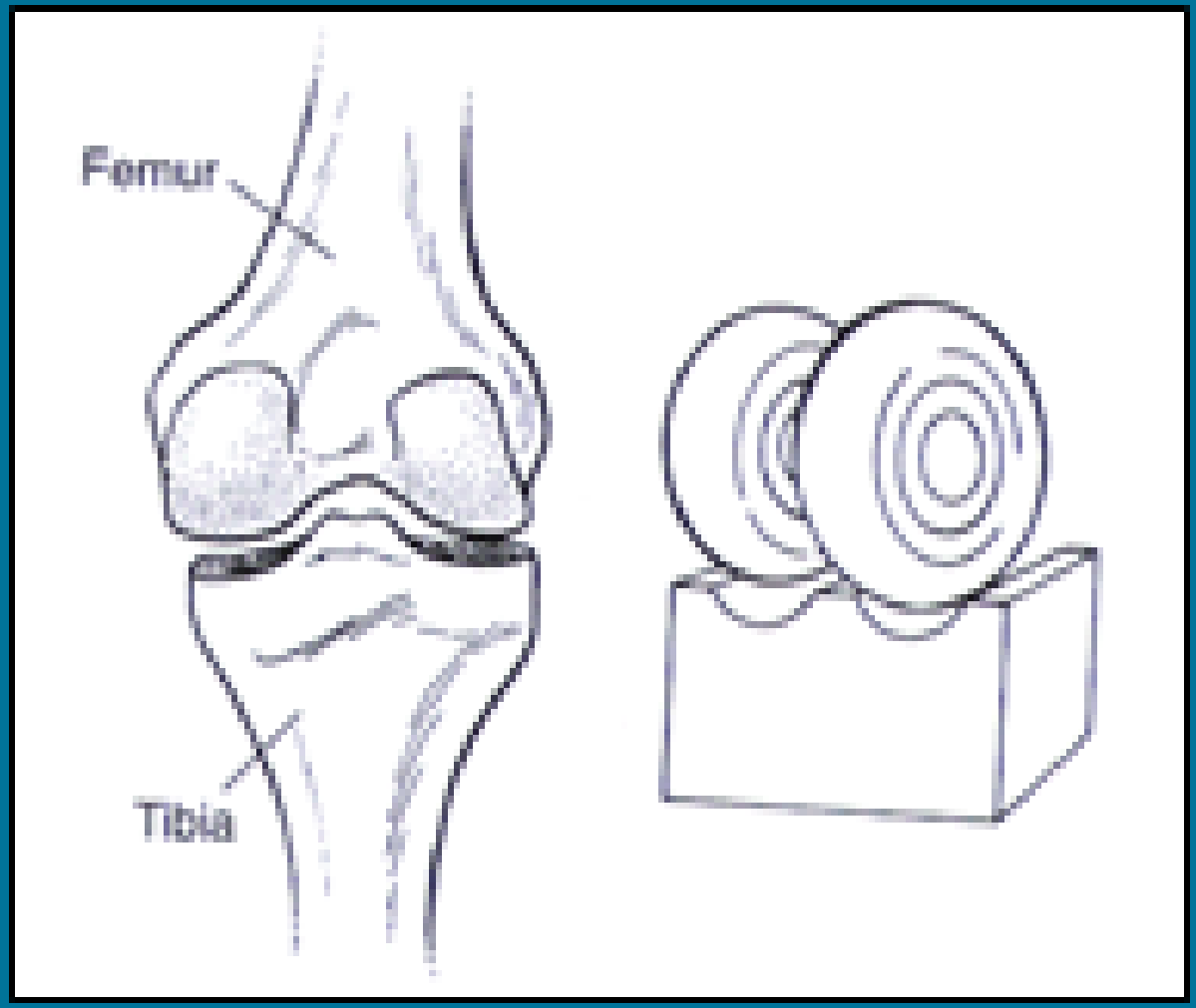
2-pivot joint

The movement occur between a rod rod and a ring i.e. the axis is longitudinal (i.e. along the bone).
Example: Superior radio-• ulnar joint.
(pronation, supination)





- **3. Condylar joint:**
- **Two knuckles articulate with two shallow concavities**.
- Example: **Knee joint.**



b-Biaxial joint

The joint moves around two axes.

1-Ellipsoid joint.

-oval convex articular surface with elliptical concavity.

-Example: Wrist joint.

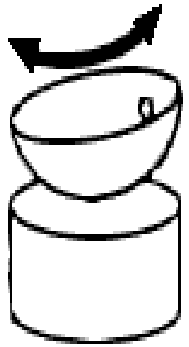
-Movement:

flexion extention

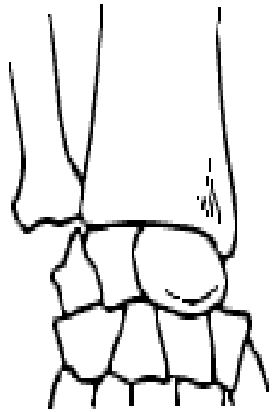
adduction abduction

Ellipsoid joint

- Elliptical convex surface of one bone articulates with elliptical concave surface of another bone.
- The movements are permitted in two directions.
- Eg; wrist joint , atlanto occipital joint,metacarpo phalangeal joints,metatarso phalangeal joint



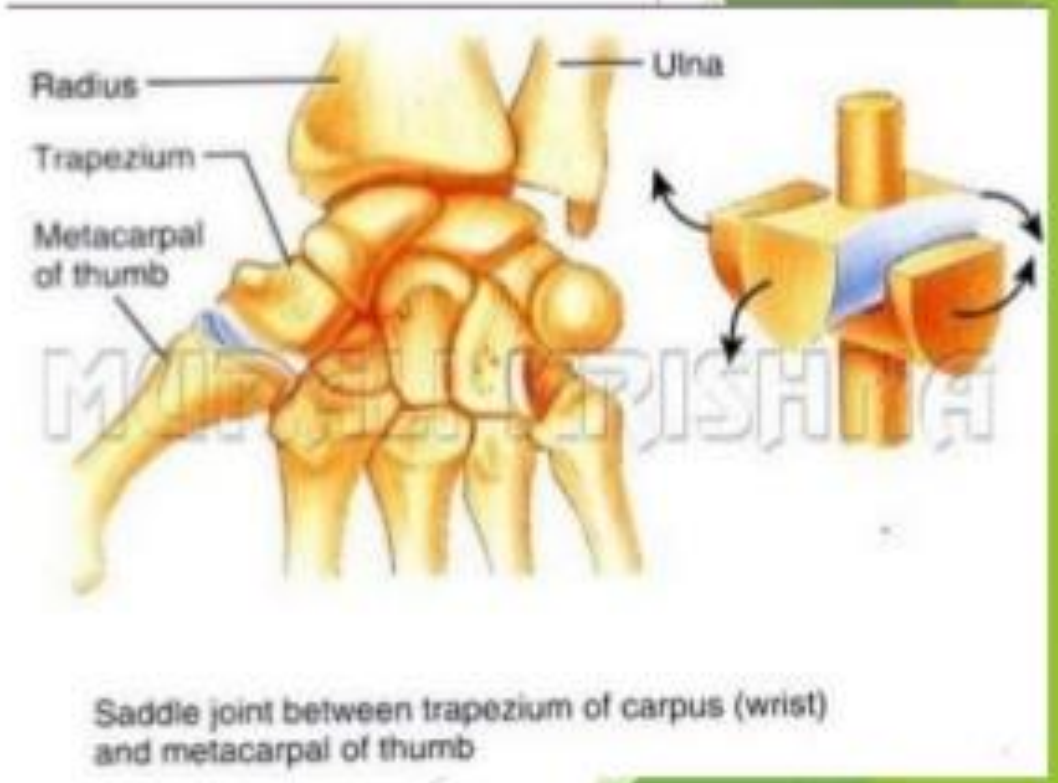
Biaxial Joint



Radiocarpal Joint

Saddle Joint

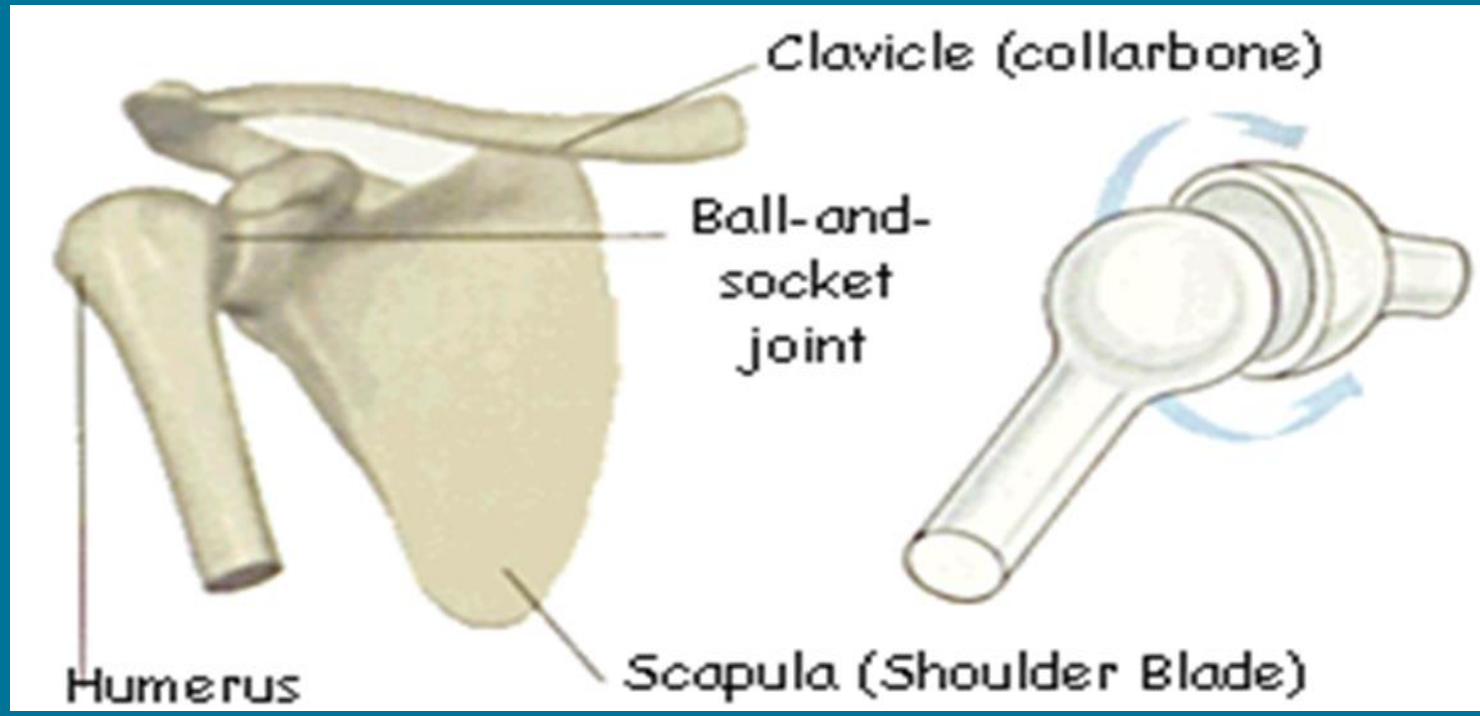
- Saddle Joint: The articular surfaces are reciprocally saddle shaped i.e .concavo -convex.this unique artiulation is modified condyloid joint that allows a wide range of movement.
- An example would be the joint between the trapezium and the metacarpal bones of the thumb,sternoclavicular joint.



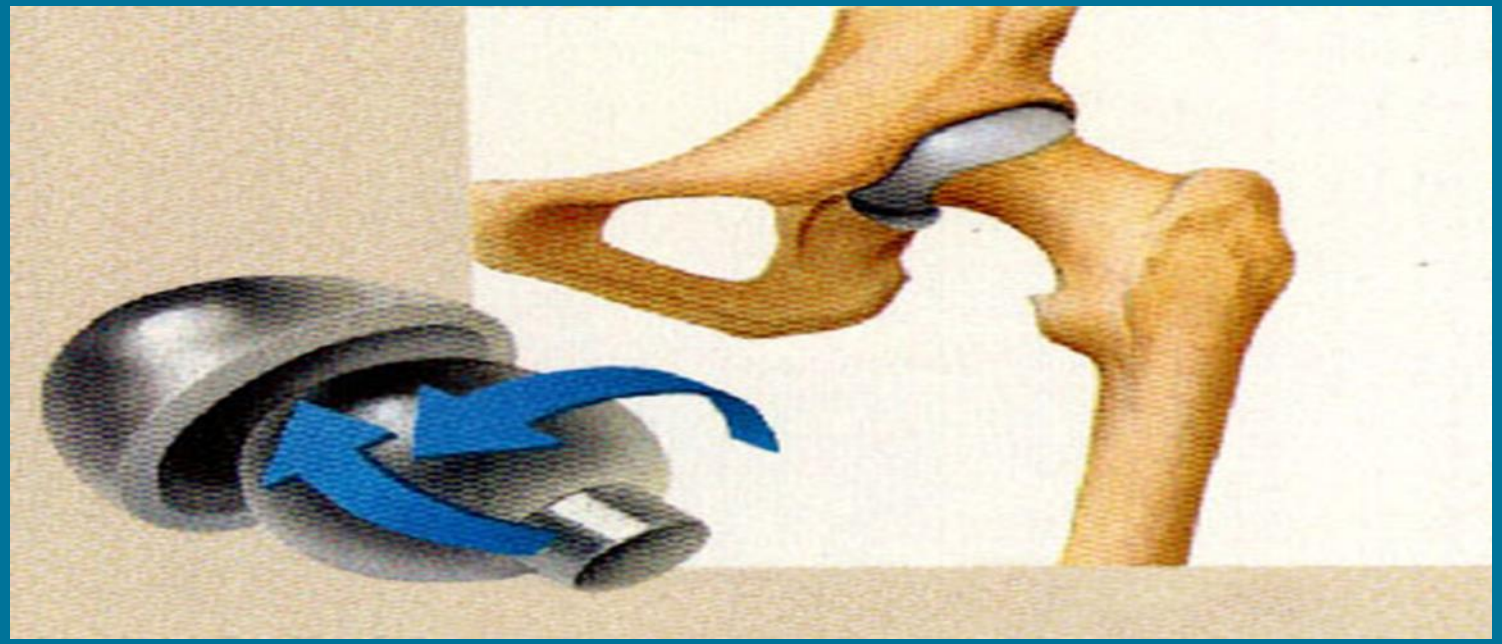
Saddle joint between trapezium of carpus (wrist) and metacarpal of thumb

3- Polyaxial

- ball articulates with a socket
- example: hip joint - shoulder joint



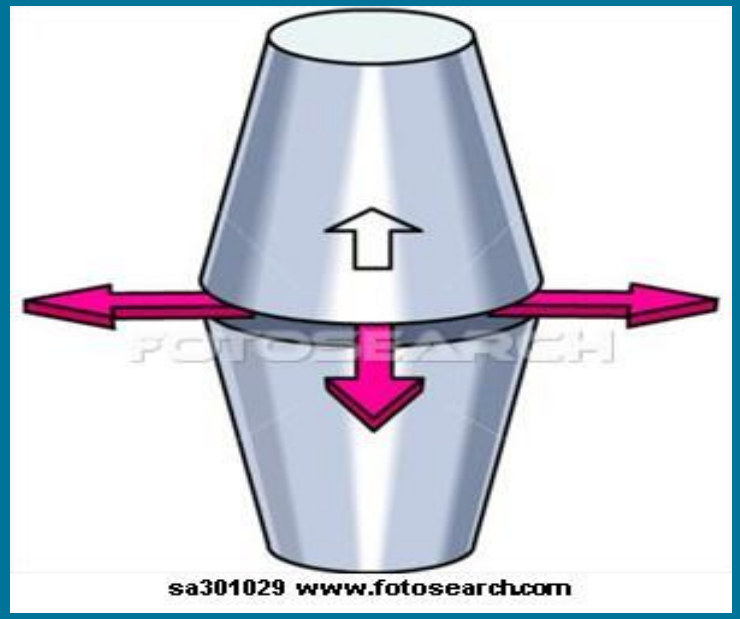
- movements: (flexion –extension – abduction –adduction medial and lateral rotation and circumduction)



4-Plane (nonaxial) joint:-

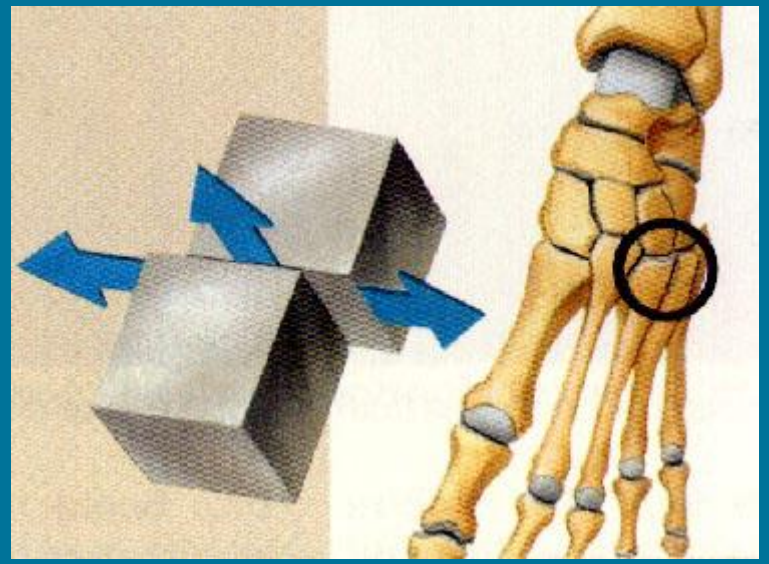
-Two smooth flat surface.-

gliding movement.



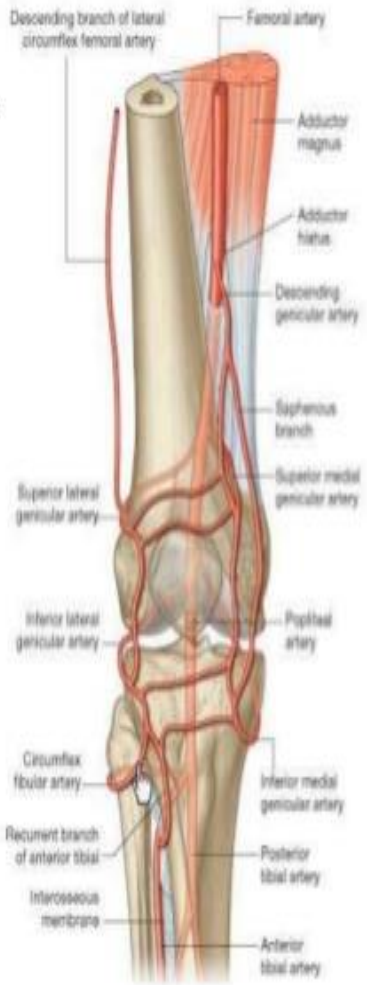
-Example :

Intercarpal , intertarsal joints



BLOOD SUPPLY

- Periarticular arterial plexuses– circulus articularis vasculosus
- Articular cartilage: avascular
- Fibrous capsule & ligaments: **poor** blood supply
- Synovial membrane: **rich** blood supply



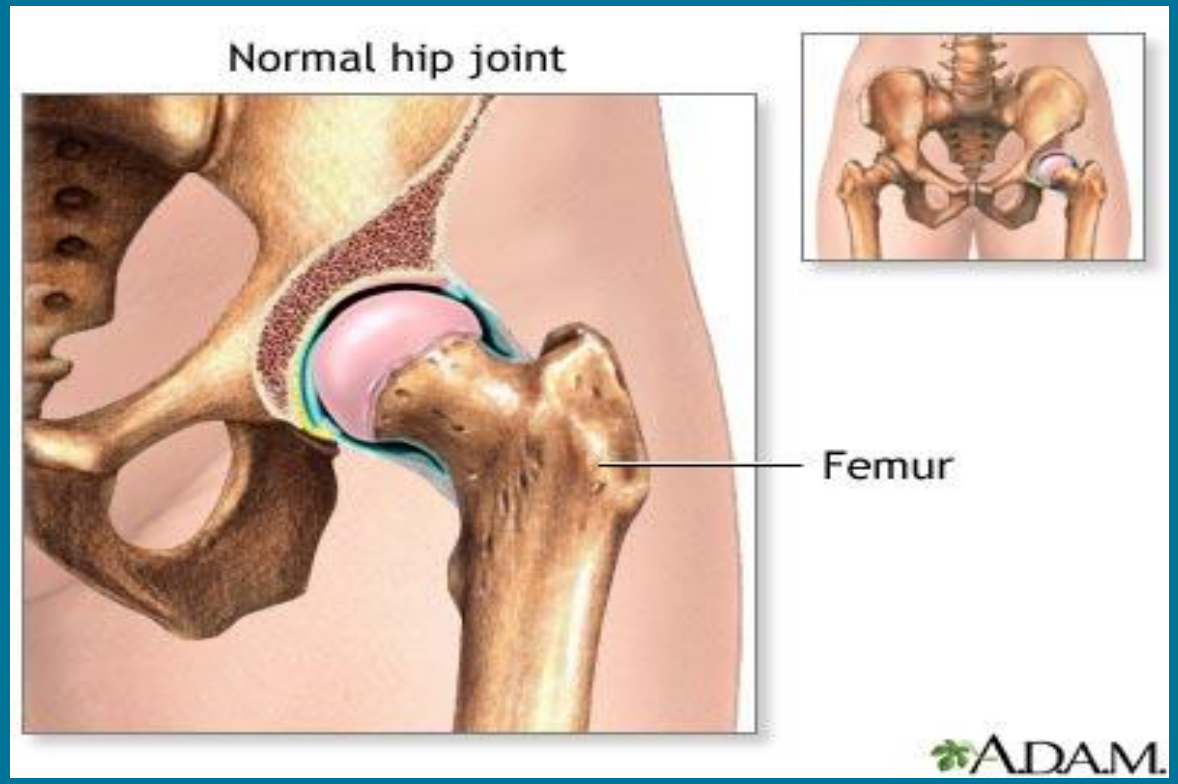
- **NERVE SUPPLY OF JOINTS**
- The nerve supply of any joint comes from the nerves that supply the muscles acting on that joint. This is called "Hilton's Law".

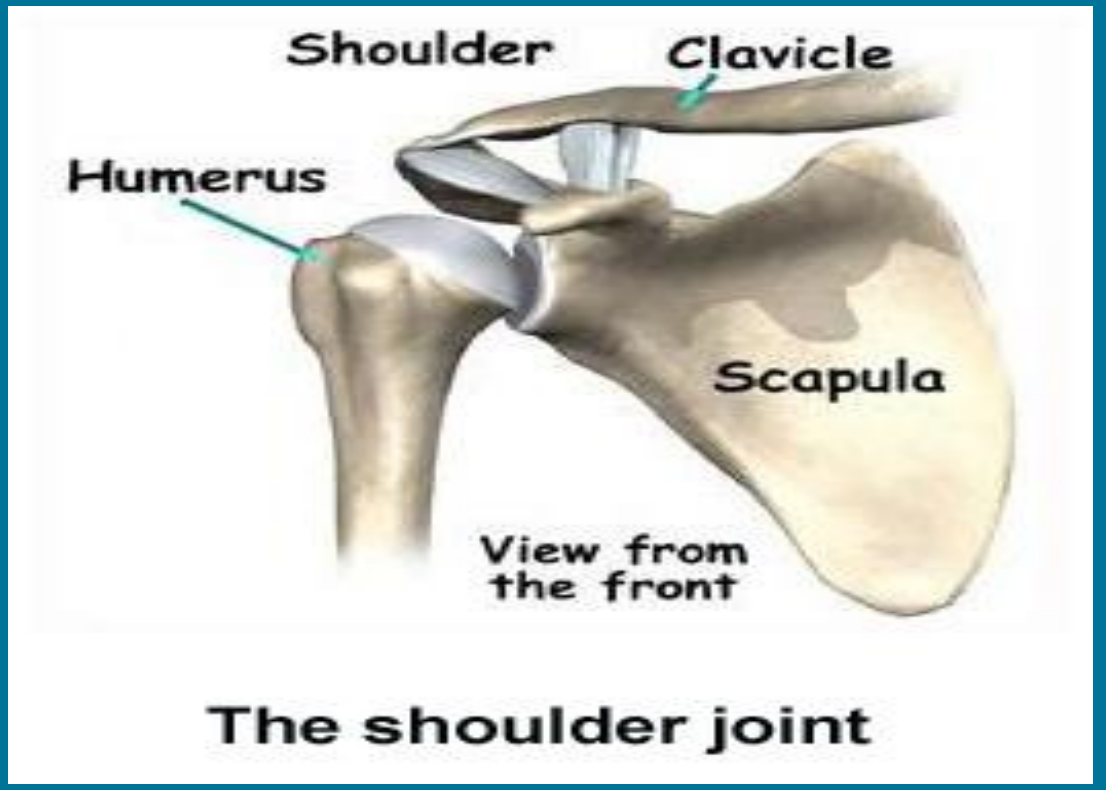
Factors affecting the stability of joints

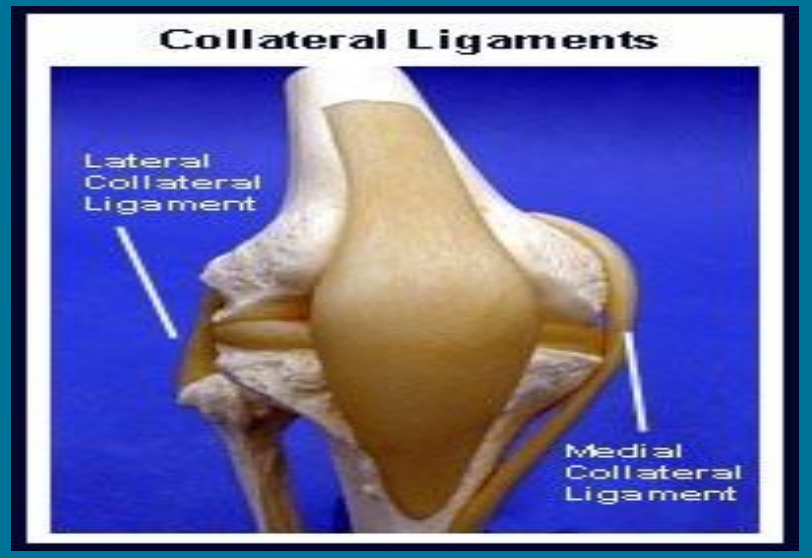
*BONES: the shape of articular bones affects the stability of joints whether they fit together or not

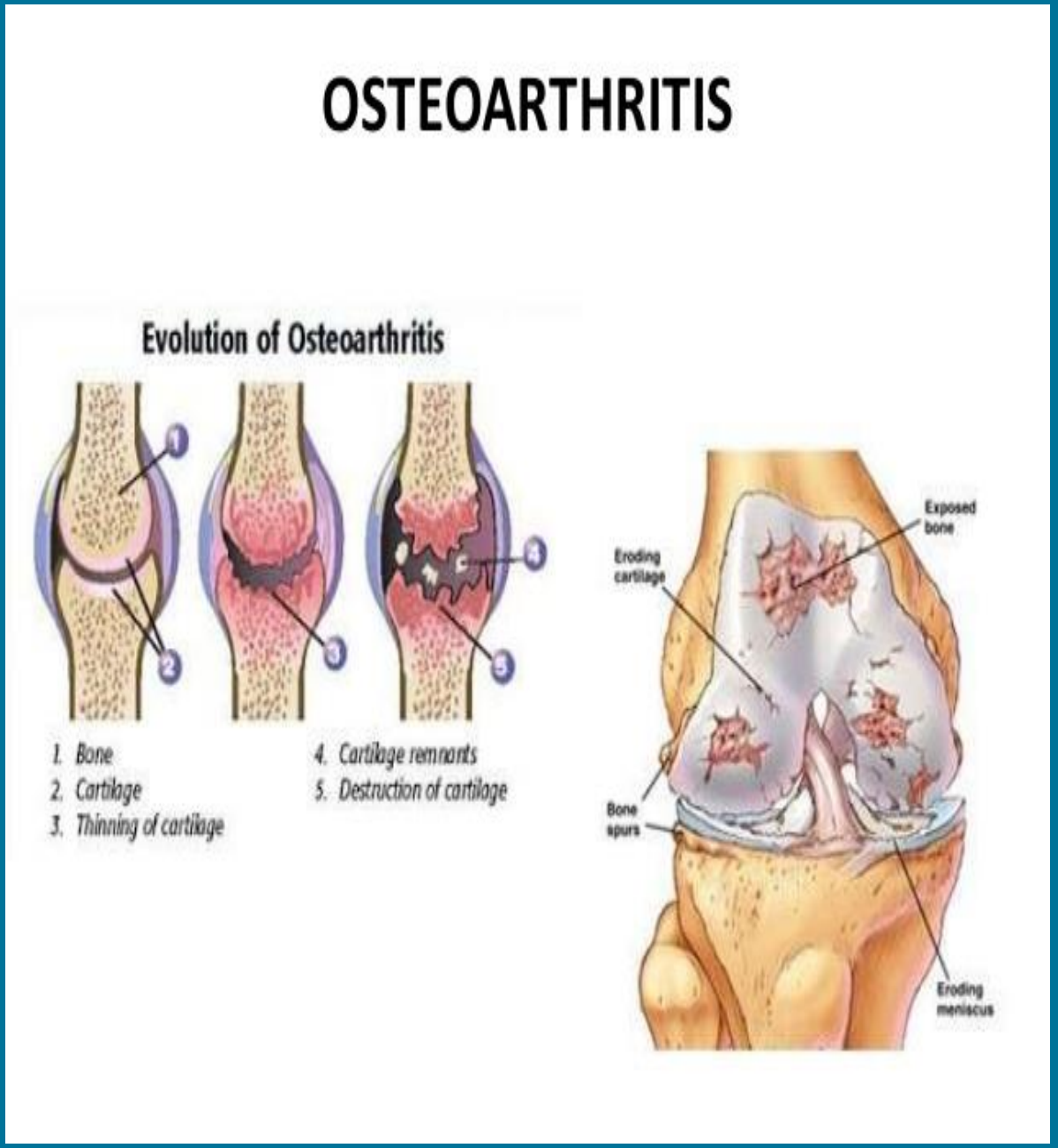
*MUSCLES: the stronger the surrounding muscles the more is the stability of the joint

*LIGAMENTS AND CAPSULES: the stronger the surrounding ligaments which connect the 2 bones the more is the stability of the joint


Normal hip joint
Femur
A.D.A.M.


Shoulder
Clavicle
Humerus
Scapula
View from the front
The shoulder joint


Collateral Ligaments
Lateral Collateral Ligament
Medial Collateral Ligament



- **Applied Anatomy of Joints:**
- **Osteoarthiritis:** It is a common disease affecting the big joints especially in females. It is associated with fragmentation of the articular cartilage.


Thank You!